CONTENTS

JANUARY, 1938

Vibration Spectra and Electric Moments of Azomethane, N−N′ Dimethylhydrazine and Acetaldazine . . . . . W. WEST AND ROBERT B. KILLINGSWORTH 1
Raman Spectra of Benzene and Isotope Effect . H. C. CHENG, C. F. HSUEH AND TA-YOU WU 8
Infrared Absorption of the OH Group of Phenol . . WALTER GORDY AND ALVIN H. NIELSEN 12
Potential Energy Curve of the Excited State of LiH . . . . . E. J. ROSENBAUM 16
Low Temperature Heat Capacity of Gaseous Ethane . G. B. KISTIAKOWSKY AND FALIH NAZMI 18
Thermodynamic Functions of the Chloro- and Bromomethanes, Formaldehyde and Phosgene . . . . . D. P. STEVENSON AND J. Y. BEACH 25
Propagation of Sound in Gases . . . . . HAROLD L. SAXTON 30
Kinetics of the Reaction $H+C_2H_6=CH_4+CH_3$ . . . . . E. W. R. STEACIE 37
Entropies of Nitrogen Tetroxide and Nitrogen Dioxide. The Heat Capacity from 15°K to the Boiling Point. The Heat of Vaporization and Vapor Pressure. The Equilibria $N_2O_4=2NO_2=2NO+O_2$ . . . . . W. F. GIAUQUE AND J. D. KEMP 40

Letter to the Editor:

Viscosity of Monolayers: Theory of the Surface Slit Viscosimeter . . . . . WILLIAM D. HARKINS AND JOHN G. KIRKWOOD 53

FEBRUARY, 1938

Ultraviolet Absorption of Simple Hydrocarbons. IV. Unsaturated Cyclic Hydrocarbons in the Schumann Region. . . . . EMMA P. CARR AND HILDEGARD STÜCKLEN 55
Infrared Absorption Studies. IV. The Infrared Spectrum of Water in an Inert Solvent . . . . . L. B. BORST, A. M. BUSWELL AND W. H. RODEBUSH 61
Spectral Investigation of Glucose Glass . . . . . WILLI M. COHN 65
Heat Capacity of Diamond from 70 to 300°K . . . . . KENNETH S. PITZER 68
Order and Disorder in Binary Solid Solutions . . . . . JOHN G. KIRKWOOD 70
Electron Diffraction Investigation of the Molecular Structures of Ketene and Thiophosphoryl Chloride . . . . . J. Y. BEACH AND D. P. STEVENSON 75
On the Adiabatic Demagnetization of Caesium Titanium Alum . . . J. H. VAN VLECK 81
Statistical Mechanics of Condensing Systems. III. . JOSEPH E. MAYER AND S. F. HARRISON 87
Statistical Mechanics of Condensing Systems. IV. . S. F. HARRISON AND JOSEPH E. MAYER 101
Note on the Second or Gaussian Approximation in the Heisenberg Theory of Ferromagnetism When $S>\frac{1}{2}$ . . . . . J. H. VAN VLECK 105

Letters to the Editor:

Bond Force Constants and Vibrations of Tetramethylmethane and Tetramethylsilicon . . . . . F. T. WALL AND C. R. EDDY 107
Alterations in the Infrared Absorption Spectrum of Water in Gelatin . . . . . JOSEPH W. ELLIS AND JEAN BATH 108
Errata: Thermodynamic Functions of the Chloro- and Bromomethanes, Formaldehyde and Phosgene . . . . . D. P. STEVENSON AND J. Y. BEACH 108
Photosynthesis . . . ALEXANDER F. KNOLL, FREDERIC L. MATTHEWS, JR. AND RAY H. CRIST 109
Infrared Absorption Spectrum of Heavy Acetic Acid . . . R. C. HERMAN AND R. HOFSTADTER 110

MARCH, 1938

Fourier Analysis of Liquid Methyl Alcohol . . . . . G. G. HARVEY 111
Isotope Effect in the Vibration Spectrum of CCl_4 . C. K. WU AND G. B. B. M. SUTHERLAND 114
Photolysis of Acetone in Presence of Hydrogen . HUGH S. TAYLOR AND CHARLES ROSENBLUM 119
Simple Method for Determining the Polarization of Raman Lines . . . . . JOHN T. EDSALL AND E. BRIGHT WILSON, JR. 124
Influence of Salts on the Absorption Spectra of Aqueous Cobalt Chloride Solutions . . . . . J. N. PEARCE AND LYLE R. DAWSON 128
Theory of Order for the Copper Gold Alloy System . . . . . W. SHOCKLEY 130
Unimolecular Decomposition of Gaseous Chloropicrin . E. W. R. STEACIE AND W. MCF. SMITH 145
Interpretation of the Properties of Alkali Halide-Thallium Phosphors . . FREDERICK SEITZ 150
Solvent Action on Optical Rotatory Power. II. The Quadrupole Field of the CS_2 Type Molecule . . . . . KARL COHEN AND CHARLES O. BECKMANN 163

Letters to the Editor:

Energy of Isomerization of Normal Pentane into Tetramethylmethane . . . . . FREDERICK D. ROSSINI AND JOHN W. KNOWLTON 168

Note . . . . . HAROLD L. SAXTON 168

Absorption Spectrum of Free Hydroxyl Calibrated for a Chemical Test . . . . . O. OLDENBERG AND F. F. RIEKE 169

Raman Effect in Liquid Ethylene . . . . . GEORGE GLOCKLER AND M. M. RENFREW 170

Abstracts of Papers Presented Before Meeting of Section C—Chemistry: American Association for the Advancement of Science, Indianapolis, Indiana, December 28–30, 1937 . 171

APRIL, 1938

Mercury Photosensitized Decomposition of Ethane . . . . . E. W. R. STEACIE AND N. W. F. PHILLIPS 179

Effect of Electric Fields on the Decomposition of Ammonia by Alpha-Rays . . . . . CATHERINE SMITH AND HARRY ESSEX 188

Infra-Red and Raman Spectra of Polyatomic Molecules. I. An Automatic Prism Spectrometer for the Infra-Red . . . . . HAROLD GERSHINOWITZ AND E. BRIGHT WILSON, JR. 197

Limits of Infra-Red Sensitizing . . . . . G. KORNFELD 201

Fine Structure of the Totally Symmetrical Raman Lines in Benzene and Benzene-d_6 . . . . . A. LANGSETH AND R. C. LORD, JR. 203

Determination of Intermolecular Forces from the Joule-Thomson Coefficients . . . . . J. O. HIRSCHFELDER, R. B. EWELL AND J. R. ROEBUCK 205

Note on the Free Energy of Acetylene . . . . . A. R. GORDON 219

Letters to the Editor:

Near Infra-Red Absorption Spectrum of Sucrose Crystals in Polarized Light . . . . . JOSEPH W. ELLIS AND JEAN BATH 221

Liquid State . . . . . R. W. GURNEY AND N. F. MOTT 222

Secular Equation for Molecular Vibrations . . . . . E. BRIGHT WILSON, JR. AND BRYCE L. CRAWFORD, JR. 223

Polarization of the Absorption Lines of Single Crystals of Rare Earth Salts . . . . . K. S. KRISHNAN AND D. C. CHAKRABARTY 224

Infra-Red Absorption Spectrum of Nickel Carbonyl Vapor . C. R. BAILEY AND ROY R. GORDON 225

Low and High Raman Frequencies for Water . . . . . G. BOLLA 225

Viscosity of Monomolecular Films . . . . . D. G. DERVICHIAN AND M. JOLY 226

MAY, 1938

Chemical Reactions of Organic Compounds with X-Ray Activated Water . . . . . HUGO FRICKE, EDWIN J. HART AND HOMER P. SMITH 229

Near Ultraviolet Bands of Acetylene . . . . . SHO-CHOW WOO, TA-KONG LIU, T. C. CHU AND WU CHIH 240

Infra-Red and Raman Spectra of Polyatomic Molecules. II. Cis- and Trans-butene-2 . . . . . HAROLD GERSHINOWITZ AND E. BRIGHT WILSON, JR. 247

Separation of Gaseous Isotopes by Diffusion . . . . . R. SHERR 251

On the Paramagnetic Conversion of Parahydrogen and Orthodeuterium in the Presence of Nitrous Oxide (The Magnetic Moment of the Deuteron) . . . . . L. FARKAS AND U. GARBATSKI 260

On the Nature of Ionic Sign Preference in C. T. R. Wilson Cloud Chamber Condensation Experiments . . . . . L. B. LOEB, A. F. KIP AND A. W. EINARSSON 264

Inhibition of Homogeneous Organic Decompositions . . . F. O. RICE AND O. L. POLLY 273

Arrangement of Molecules in a Single Layer and in Multiple Layers . . . . . L. H. GERMER AND K. H. STORKS 280

Letters to the Editor:

Lifetime of Free CN Radical . . . . . JOHN UNDERHILL WHITE 294

Catalysis in the Exchanges of Organic Compounds with Heavy Oxygen Water . . IRVING ROBERTS 294

Raman Effect in Liquid Ethane . . . . . GEORGE GLOCKLER AND M. M. RENFREW 295

Oxygen Exchange Reaction of Glycine Hydrochloride and Water . . . WHITNEY H. MEARS 295

Concentration of N^{15} and S^{34} . . . . HARRY G. THODE, JOHN E. GORHAM AND HAROLD C. UREY 296

Hydrogen Bond and Infra-Red Absorption . . . . . A. M. BUSWELL AND W. H. RODEBUSH 296

Spectroscopic Study of the Symmetries of the Fields About Ions in Solution . . . . . Simon Freed and S. I. Weissman 297
Note on Surface Viscosimetry . . . . . W. D. Harkins and J. G. Kirkwood 298
Temperature Effect in the Infra-Red Spectrum of Phenol . . . . . R. Robert Brattain 298
Effect of Deuterium Substitution on Color . . . . Samuel H. Maron and Victor K. LaMer 299

June, 1938

Measurements of Low Vapor Pressures of Alkali Halides . . . . . Joseph E. Mayer and Irmgard Hölder Wintner 301
Mechanism of Formation of Mercury Hydride and Mercury Deuteride. Optical Excitation of Cadmium Deuteride . . . . . Leonard O. Olsen 307
Infra-Red Absorption Bands in the Spectrum of Deutero-Formaldehyde . . . . . Earle S. Ebers and Harald H. Nielsen 311
Change in Absorption of Water at 4.7μ Due to Solutions . . E. K. Plyler and E. S. Barr 316
Raman Spectra of Deutero-Ethylenes . M. de Hemptinne, J. Jungers and J. M. Delfosse 319
Mercury Photosensitized Hydrogenation of Ethylene, Ethylene-d_4 and Partially Deuterized Ethylenes . . . . . Joseph C. Jungers and Hugh S. Taylor 325
Temperature Variation of Diffusion Processes . . . . . Hugh S. Taylor 331
Free Energy and Entropy of Nitrosyl Chloride . . . . . Francis P. Jahn 335
Letters to the Editor:
Intermetallic Compounds Produced by Next Nearest Neighbor Interaction in Alloys . . F. Bitter 339
Raman Effect in Liquid Acetylene . . . . George Glockler and Malcolm M. Renfrew 340
Errata: Thermodynamic Functions of the Chloro- and Bromomethanes, Formaldehyde and Phosgene . . . . . D. P. Stevenson and J. Y. Beach 341

July, 1938

Raman Spectrum of Benzene Under High Dispersion and the Isotope Effect . . . . . B. Sundara Rama Rao 343
Exchange Reactions with Deuterium. II. The Photochemical Exchange Between Deuterium and Hydrogen Chloride . . . . . Philip A. Leighton and Paul C. Cross 345
Nonadiabatic Reactions. Chemiluminescence . M. G. Evans, H. Eyring and John F. Kincaid 349
Decomposition of Mercury Dimethyl . . . John P. Cunningham and Hugh S. Taylor 359
Improved Calculation of the Energies of Metallic Li and Na . . . . . J. Bardeen 367
Compressibilities of the Alkali Metals . . . . . J. Bardeen 372
Electronic Structure of the First Row Hydrides . . . . . G. W. King 378
Dielectric Absorption in Polar Media and the Local Field . . . . . Robert H. Cole 385
Theory of the Viscosity of Unimolecular Films . Walter J. Moore, Jr. and Henry Eyring 391
Electric Moments of the Methyl and Ethyl Alcohol Molecules . . . . J. D. Stranathan 395
Transference Numbers of Potassium Acetate in Aqueous Solutions . . . . . D. J. Le Roy and A. R. Gordon 398
Density of Energy States in Solids . . . . . S. H. Bauer 403
Note on the Paper by J. N. Pearce and Lyle R. Dawson on "The Influence of Salts on the Absorption Spectra of Aqueous Cobalt Chloride Solutions" . . . . . R. Brdička 404
Note on the Heat Capacities and Energies of $SiCl_4$, $TiCl_4$ and $SnCl_4$ . . Robert C. Herman 406
Letters to the Editor:
Hindered Internal Rotation of Ethane . . G. B. Kistiakowsky, J. R. Lacher and Fred Stitt 407
Absence of Spin Effects in the Heat Capacity of Ethane Gas . . . . . E. Bright Wilson, Jr. 408
Carbon Isotope Effect in the Raman Spectrum of Dimethylacetylene . . . . . George Glockler and M. M. Renfrew 408
Raman Effect in Liquid Ethylene and Ethane . . . George Glockler and M. M. Renfrew 409

August, 1938

Effect of Temperature on the Atomic Distribution in Liquid Potassium . . . . . C. D. Thomas and Newell S. Gingrich 411
Primary Processes in Photodecomposition . . . Milton Burton and G. K. Rollefson 416
Raman Spectrum of Boron Trifluoride Gas . . . . . Don M. Yost, Don DeVault, Thomas F. Anderson and Edwin N. Lassettre 424

Raman Spectra of Hydrogen and Deuterium Sulfides in the Gas, Liquid and Solid States . . . . . GEORGE M. MURPHY AND JOHN E. VANCE 426
Fractionation of the Lithium and Potassium Isotopes by Chemical Exchange with Zeolites . . . . . THOMAS IVAN TAYLOR AND HAROLD C. UREY 429
Kinetics of OH Radicals as Determined by Their Absorption Spectrum. III. A Quantitative Test for Free OH; Probabilities of Transition . . O. OLDENBERG AND F. F. RIEKE 439
Absolute Rates of Heterogeneous Reactions. I. The General Theory of Adsorption . . . . . GEORGE E. KIMBALL 447
Interpretation of the Properties of Zinc Sulphide Phosphors . . . . FREDERICK SEITZ 454
Determination of the Magnetic Susceptibilities of Certain Inorganic Complex Compounds . . . . . J. H. FRAZER AND N. O. LONG 462
Energy and Entropy of Activation of the Reaction Between Nitric Oxide and Chlorine . . . . . IRVING WELINSKY AND H. AUSTIN TAYLOR 466
Solid-Liquid Equilibrium in Argon . . . . . O. K. RICE 472
On Communal Entropy and the Theory of Fusion . . . . . O. K. RICE 476
Entropy of Ethyl Alcohol from Molecular Data and the Equilibrium in the Hydration of Ethylene . . . . . S. C. SCHUMANN AND JOHN G. ASTON 480
Entropy of Acetone and Isopropyl Alcohol from Molecular Data. The Equilibrium in the Dehydrogenation of Isopropyl Alcohol . . . . S. C. SCHUMANN AND JOHN G. ASTON 485
Role of Free Radicals in Elementary Organic Reactions . . F. O. RICE AND E. TELLER 489

Letters to the Editor:

Vapor-Liquid-Solution Displacements in Vibration Absorption Bands . . . . . J. W. ELLIS AND E. L. KINSEY 497
On the Question of the Intra- and Intermolecular "Hydrogen Bond" and the Absorption Spectra in the Near Infra-Red . . . . . RENÉ FREYMANN 497

SEPTEMBER, 1938

Exchange Forces and Electrostatic Forces Between Ions in Solution . RONALD W. GURNEY 499
Electrostatic Influence of Substituents on the Dissociation Constants of Organic Acids. I . . . . . J. G. KIRKWOOD AND F. H. WESTHEIMER 506
Electrostatic Influence of Substituents on the Dissociation Constants of Organic Acids. II . . . . . F. H. WESTHEIMER AND J. G. KIRKWOOD 513
Photochemical Studies. XXVII. The Effect of Radiation on Mixtures of Nitrogen Dioxide and Nitrous Oxide and its Relationship to the Photochemical Decomposition of Nitrous Oxide . . . . F. C. HENRIQUES, JR., A. B. F. DUNCAN AND W. ALBERT NOYES, JR. 518
On the Interaction of Atoms in Alloys . . . . . WILLIAM SHOCKLEY 523
Vibrational Spectrum and Thermodynamic Properties of Nickel Carbonyl . . . . . BRYCE L. CRAWFORD, JR. AND PAUL C. CROSS 525
Vibration Spectra and Molecular Structure. IV. The Infra-Red Absorption Spectra of the Double and Single Molecules of Formic Acid . LYMAN G. BONNER AND ROBERT HOFSTADTER 531
Vibration Spectra and Molecular Structure. V. Infra-Red Studies on Light and Heavy Acetic Acids . . . . . R. C. HERMAN AND R. HOFSTADTER 534
Vibration Spectra and Molecular Structure. VI. Infra-Red Absorption Spectrum of Heavy Formic Acid . . . . . ROBERT HOFSTADTER 540
Raman Spectrum and Fluorescence of Dioxane . . . . . HUGH W. HUNTER 544
Infra-Red Study of Several Liquid Crystals . . RICHARD TASCHEK AND DUDLEY WILLIAMS 546
Infra-Red Absorption Spectrum of Methyl Alcohol . . . AVIS BORDEN AND E. F. BARKER 553
Infra-Red Absorption Spectra of CH_3OD and CH_2DOD . . . . . E. F. BARKER AND G. BOSSCHIETER 563

Letter to the Editor:

Free Energy of the Producer-Gas Reaction, and the "Zero-Point" Entropy of Graphite . . . . . FREDERICK D. ROSSINI 569

OCTOBER, 1938

Exchange of Deuterium Between Methanol and Water: Vibrations of the Hydroxyl Group in Methanol and Methanol-*d*: The Entropy of Methanol . . . . . J. O. HALFORD AND B. PECHERER 571
Absorption Spectra of Cyclopropane, Ethylene Oxide, Ethylene Sulfide, and Ethylene Imine in the Photographic Infra-Red . . . . . EUGENE H. EYSTER 576

Spectrum of Allene in the Photographic Infra-Red . . . . . EUGENE H. EYSTER 580
Raman Spectrum of Liquid Diborane . . . . THOMAS F. ANDERSON AND ANTON B. BURG 586
Variation of the Raman Spectrum of Nitrate Solutions with Cation . . . . . ELIZABETH R. LAIRD AND FRANCES M. PLESSET 592
Temperature Scale and Thermionic Emission from Rhodium . . . . . H. B. WAHLIN AND L. V. WHITNEY 594
Diffusion of Hydrogen Through Nickel . . . . . C. B. POST AND W. R. HAM 598
Low Temperature Oxidation of Iron . . . . . H. R. NELSON 606
Diffusion of Helium and of Hydrogen Through Pyrex Chemically Resistant Glass . . . . . NELSON W. TAYLOR AND WILLIAM RAST 612
Free Volumes and Free Angle Ratios of Molecules in Liquids . . . . . JOHN F. KINCAID AND HENRY EYRING 620
Order *Versus* Disorder in Ternary Structures Including Certain Spinels . . . F. C. BLAKE 630
Dipole Moments of Molecules Containing Two Movable Dipoles . . . . . J. Y. BEACH AND D. P. STEVENSON 635
Internal Rotation in Ethylene Chloride . . . . . J. Y. BEACH AND K. J. PALMER 639
Calculations of the Lower Excited Levels of Benzene . M. GOEPPERT-MAYER AND A. L. SKLAR 645
Letters to the Editor:
Absorption Coefficients of the Acetyl Halides . . . . . D. H. ETZLER AND G. K. ROLLEFSON 653
Raman Frequencies of Hexamethylene Glycol . . . . . R. C. WILLIAMSON 653
Structure of Liquid Aliphatic Amines . . . . . B. V. THOSAR 654
Mayer's Theory of Condensing Systems . . . . . WILLIAM BAND 654
On the Symmetries of the Fields About Ions in Solution. Equilibrium between Forms of Different Symmetry . . . . . SIMON FREED AND H. F. JACOBSON 654
Symmetries of the Fields About Ions in Solution and Electrolytic Dissociation . . . SIMON FREED 655
Separation of the Carbon Isotopes by Diffusion . . . . . P. CAPRON, J. M. DELFOSSE, M. DE HEMPTINNE AND H. S. TAYLOR 656
Diamagnetism of Gaseous Nitrosyl Chloride . . CARROL M. BEESON AND CHARLES D. CORYELL 656

NOVEMBER, 1938

Atomic Distribution in the Allotropic Forms of Phosphorus at Different Temperatures . . . . . C. D. THOMAS AND NEWELL S. GINGRICH 659
X-Ray Analysis of the Structure of Water . . . . . J. MORGAN AND B. E. WARREN 666
Competition of Predissociation Processes in the Photolysis of Polyatomic Molecules . . . . . G. K. ROLLEFSON AND MILTON BURTON 674
Mechanism of the Photolysis of Deutero-Ammonia . . . . . MILTON BURTON 680
Infra-Red and Raman Spectra of Polyatomic Molecules. III. Ethane . . . . . BRYCE L. CRAWFORD, JR., WILLIAM H. AVERY AND J. W. LINNETT 682
Infra-Red and Raman Spectra of Polyatomic Molecules. IV. Allene . . . . . J. W. LINNETT AND W. H. AVERY 686
Infra-Red and Raman Spectra of Polyatomic Molecules. V. Cyclopropane and Ethylene Oxide . . . . . J. W. LINNETT 692
Partial Analysis of Some Infra-Red Absorption Spectra of Organic Molecules in Dilute Solution . . . . . OLIVER R. WULF AND LOLA S. DEMING 702
Band Envelopes of Unsymmetrical Rotator Molecules. I. Calculation of the Theoretical Envelopes . . . . . RICHARD M. BADGER AND LLOYD R. ZUMWALT 711
Calculation of the Frequencies of the Symmetrical Modes of Vibration for Molecules with Various Types of Symmetry . . . . . H. J. BERNSTEIN 718
Modifications in the Near Infra-Red Absorption Spectra of Protein and of Light and Heavy Water Molecules When Water is Bound to Gelatin . . . . . JOSEPH W. ELLIS AND JEAN BATH 723
Wave Functions and Potential Curves for Excited H_2 . . . . . ALBERT SPRAGUE COOLIDGE AND HUBERT M. JAMES 730
Negative Bands of $N^{14}-N^{15}$ . . . . . R. W. WOOD AND G. H. DIEKE 734
Nuclear Spin and Symmetry Effects in the Heat Capacity of Ethane Gas . . . . . E. BRIGHT WILSON, JR. 740
Relative Adsorbabilities of Hydrogen and Deuterium . . . . . A. WHEELER 746

Letters to the Editor:

Raman Spectrum of Thiophosgene . . . . . H. W. THOMPSON 748
Statistical Mechanics of Mobile Monolayers . . . . . WILLIAM BAND 748

DECEMBER, 1938

Diffuse Electron Diffraction Patterns . . . . . J. T. BURWELL 749
Ultraviolet Absorption Bands Ascribed to HNO_2 . . . D. M. NEWITT AND L. E. OUTRIDGE 752
Infra-Red Absorption of Carboxylic Acids in Solution. I. Qualitative Features . . . . . M. M. DAVIES AND G. B. B. M. SUTHERLAND 755
Infra-Red Absorption of Carboxylic Acids in Solution. II. Intensities . . . . . M. M. DAVIES AND G. B. B. M. SUTHERLAND 767
Infra-Red Study of Omega-Hydroxyundecanoic Acid in Carbon Tetrachloride . . . . . MANSEL M. DAVIES 770
Infra-Red Bands of Methylamine and the Phenomenon of Free Rotation . . . . . H. W. THOMPSON AND H. A. SKINNER 775
Kinetics of OH Radicals Determined by Their Absorption Spectrum. IV. Pressure Broadening and the Line Spectrum as Background . . . . . O. OLDENBERG AND F. F. RIEKE 779
Alpha-Particle Reactions in Carbon Monoxide, Oxygen and Carbon Dioxide Systems . . . . . JOSEPH O. HIRSCHFELDER AND HUGH S. TAYLOR 783
Slow Electron Scattering and the Apparent Electron Affinity of Mercury . . . . . J. H. SIMONS AND R. P. SEWARD 790
Energy of the Triatomic Hydrogen Molecule and Ion, V . . . JOSEPH O. HIRSCHFELDER 795
Integrals Required for Computing the Energy of H_3 and of H_3^+ . . . . . JOSEPH O. HIRSCHFELDER AND CORNELIUS N. WEYGANDT 806
Reaction of Hydrogen Atoms with Carbon Tetrachloride . . . . . JOHN E. VANCE AND W. C. BAUMAN 811
Calculation of Bond Strengths from Photochemical Evidence . . . . . MILTON BURTON 818
Optical Activity of Secondary Butyl Alcohol . . . . . EVERETT GORIN, JOHN WALTER AND HENRY EYRING 824
Kinetic Approach to the Theory of Conductance of Infinitely Dilute Solutions, Based on the "Cage" Model of Liquids . . . . . MILTON J. POLISSAR 833
Equation for Transference Numbers . . . . . THEODORE SHEDLOVSKY 845
Molecular Interaction in Mixed Monolayers on Aqueous Subsolutions. I. Mixtures of Alcohols, Acids and Amines . . . . WILLIAM D. HARKINS AND ROBERT T. FLORENCE 847
Molecular Interaction in Mixed Monolayers. II. Unstable Mixtures with Unsaturated Acids . . . . . ROBERT T. FLORENCE AND WILLIAM D. HARKINS 856
Migration and Photochemical Action of Excitation Energy in Crystals . . . . . JAMES FRANCK AND EDWARD TELLER 861
Role of Attractive and Repulsive Forces in the Formation of Tactoids, Thixotropic Gels, Protein Crystals and Coacervates . . . . . IRVING LANGMUIR 873
Quadrupole Contributions to London's Dispersion Forces . . . . . HENRY MARGENAU 896
Internal Rotation of Propane and Propylene; the Origin of Internal Restricting Potentials . . . . . G. B. KISTIAKOWSKY, J. R. LACHER AND W. W. RANSOM 900
Note on the Raman Spectra of Nitrogen . . . . . CHARLES E. MILLER 902
Correction: On the Paramagnetic Conversion of Parahydrogen and Orthodeuterium in the Presence of Nitrous Oxide (The Magnetic Moment of the Deuteron) . . . . . L. FARKAS AND U. GARBATSKI 904

Letters to the Editor:

Dielectric Polarization of Formic Acid Vapor . . I. E. COOP, N. R. DAVIDSON AND L. E. SUTTON 905
Dipole Moment and Surface Potentials . . . . . M. GEROVICH, A. FRUMKIN AND D. VARGIN 906
Equivalent Conductances of Europium Chloride and of Europium Nitrate . . . . I. M. KLOTZ 907
Correction: The Effect of Structure upon the Reactions of Organic Compounds, Temperature and Solvent Influences . . . . . LOUIS P. HAMMETT 907
Nuclear Spin of N^{15} . . . . . R. W. WOOD AND G. H. DIEKE 908
Addendum: Primary Processes in Photodecomposition . MILTON BURTON AND G. K. ROLLEFSON 908

Author Index to Volume 6 909
Analytic Subject Index to Volume 6 915
Volume Table of Contents i